WHAT IS CLAIMED IS:

I	1. A current-perpendicular-to-plane (CPP) GMR/tunnel valve (TV) sensor,
2	comprising:
3	a sensor stack having a free layer forming an active area;
4	a spacer layer formed over the free layer of the sensor stack;
5	a biasing layer disposed over the spacer; and
6	a high coercivity layer formed adjacent the sensor stack for pinning the biasing
7	layer, the biasing layer maintaining a direction of magnetization in the free layer until
8	influenced by a readback field.
1	2. The CPP GMR/ TV sensor of claim 1, wherein the high coercivity layer
2	comprises an alpha-Fe ₂ O ₃ layer.
1	3. The CPP GMR/ TV sensor of claim 1 further comprising a seed layer
2	disposed over the high coercivity layer and a coupling layer disposed over the bias layer
3	and the seed layer.
1	4. The CPP GMR/ TV sensor of claim 3, wherein the seed layer comprises a
2	NiFe seed layer, the high coercivity layer comprises an alpha-Fe ₂ O ₃ layer formed
3	adjacent the sensor stack in a passive area and the coupling layer comprises NiFe layer.
1	5. The CPP GMR/ TV sensor of claim 1, wherein the sensor stack comprises
2	a pinned layer, a spacer layer and the free layer.

1 6. The CPP GMR/ TV sensor of claim 5, wherein the pinned layer comprises 2 a first CoFe layer, a Ru layer and a second CoFe layer. 1 7. The CPP GMR/ TV sensor of claim 5, wherein the free layer comprises a 2 CoFe/NiFe alloy layer. 8. 1 The CPP GMR/ TV sensor of claim 5, wherein the sensor stack further 2 comprises a sensor stack seed layer, the pinned layer being formed on the seed layer. 1 9. The CPP GMR/ TV sensor of claim 8, wherein the sensor stack seed layer 2 comprises a NiFeCr layer, a NiFe layer and a PtMn layer.

The CPP GMR/ TV sensor of claim 1, wherein the bias layer attains

pinning by exchange coupling between the bias layer in the active area and passive areas.

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1	11. A magnetic storage system, comprising:
2	a magnetic storage medium having a plurality of tracks for recording of data; and
3	a CPP GMR/ TV sensor maintained in a closely spaced position relative to the
4	magnetic storage medium during relative motion between the magnetic transducer and
5	the magnetic storage medium, the CPP GMR/ TV sensor further comprising:
6	a sensor stack having a free layer forming an active area;
7	a spacer layer formed over the free layer of the sensor stack;
8	a biasing layer disposed over the spacer; and
9	a high coercivity layer formed adjacent the sensor stack for pinning the biasing
10	layer, the biasing layer maintaining a direction of magnetization in the free layer until
11	influenced by a readback field.
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1	12. The CPP GMR/ TV sensor of claim 11, wherein the high coercivity layer
2	comprises an alpha-Fe ₂ O ₃ layer.
1	13. The CPP GMR/ TV sensor of claim 11 further comprising a seed layer
2	disposed over the high coercivity layer and a coupling layer disposed over the bias layer
3	and the seed layer.
1	14. The CPP GMR/ TV sensor of claim 13, wherein the seed layer comprises
2	a NiFe seed layer, the high coercivity layer comprises an alpha-Fe ₂ O ₃ layer formed
3	adjacent the sensor stack in a passive area and the coupling layer comprises NiFe layer.

- 1 15. The CPP GMR/ TV sensor of claim 11, wherein the sensor stack 2 comprises a pinned layer, a spacer layer and the free layer.
- 1 16. The CPP GMR/ TV sensor of claim 15, wherein the pinned layer 2 comprises a first CoFe layer, a Ru layer and a second CoFe layer.
- 1 17. The CPP GMR/ TV sensor of claim 15, wherein the free layer comprises a 2 CoFe/NiFe alloy layer.
- 1 18. The CPP GMR/ TV sensor of claim 15, wherein the sensor stack further 2 comprises a sensor stack seed layer, the pinned layer being formed on the seed layer.
- 1 19. The CPP GMR/ TV sensor of claim 18, wherein the sensor stack seed 2 layer comprises a NiFeCr layer, a NiFe layer and a PtMn layer.
- 1 20. The CPP GMR/ TV sensor of claim 11, wherein the bias layer attains 2 pinning by exchange coupling between the bias layer in the active area and passive areas.

1	21. A method for reducing the thickness of a sensor stack in a current-
2	perpendicular-to-plane (CPP) GMR/tunnel valve (TV) sensor, comprising:
3	forming a sensor stack seed layer;
4	forming, over the sensor stack seed layer, a sensor stack having a free layer, a
5	spacer and a pinned layer;
6	forming a spacer over the free layer of the sensor stack;
7	forming a bias layer over the spacer;
8	adjacent to the sensor stack, forming a high coercivity layer for pinning the bias
9	layer;
10	forming a passive area seed layer over the high coercivity layer;
11	forming a layer of Ta over the bias layer and the passive area seed layer;
12	removing the Ta layer even with the bias layer;
13	forming, over the bias layer and the passive area seed layer, a coupling layer for
14	pinning the biasing layer, the biasing layer maintaining a direction of magnetization in
15	the free layer until influenced by a readback field; and
16	forming a cap over the coupling layer.